IN BRIEF

TECHNIQUES AND APPLICATIONS

Nanoscale mapping and functional analysis of individual adhesins on living bacteria

Dupres, V. *et al*. *Nature Methods* **2**, 515–520 (2005)

Atomic force microscopy (AFM) was invented in the mid-1980s, and since that time its use has afforded researchers a glimpse of many different biological surfaces at sub-nanometre resolution under physiological conditions. In this work, Dupres *et al*. use AFM to map the distribution of adhesins on the surface of living *Mycobacterium bovis* bacille Calmette–Guérin (BCG) cells immobilized on a polycarbonate membrane, as well as measuring the interaction forces between the mycobacterial adhesin heparin-binding haemagglutinin adhesin (HBHA) and a model receptor. Most notably, this study revealed that the HBHA adhesin is not present uniformly on the mycobacterial surface but instead is concentrated in nanodomains that the authors refer to as adherosomes.

SYMBIOSIS

An immunomodulatory molecule of symbiotic bacteria directs maturation of the host immune system

Mazmanian, S. K. *et al*. *Cell* **122**, 107–118 (2005)

In recent years, the mammalian 'microbiota' has received an increasing amount of attention as researchers begin to delve into the diversity present in the 10^{12} bacteria per gram of human colon content, and attempt to tease out the complex host–bacteria interactions. In a recent issue of *Cell*, Mazmanian *et al*. looked at the specific effects of monocolonization of germ-free mice with *Bacteroides fragilis* and found that *B. fragilis* colonization was sufficient to correct the $CD4^+$ T-cell deficiency in the spleens of these mice. *B. fragilis* expresses eight surface polysaccharides, several of which are zwitterionic polysaccharides (ZPSs). Further investigations revealed that the most immunodominant of the *B. fragilis* ZPSs, PSA, is essential for the immunomodulatory effects of *B. fragilis* and can correct impaired systemic $CD4^+$ T-cell maturation, an aberrant Th1/Th2 balance and defective development of the thymus. This is the first study to show a specific link between a bacterial product and the development of the mammalian immune system.

VIROLOGY

A crucial role of angiotensin converting enzyme 2 (ACE2) in SARS coronavirus–induced lung injury

Kuba, K. *et al*. *Nature Med.* 10 July 2005 (doi:10.1038/nm1267)

The carboxypeptidase angiotensin-converting enzyme 2 (ACE2) converts angiotensin II, a potent agent of cardiac damage, to the less damaging angiotensin$_{1-7}$ by removing a single phenylalanine residue. Previous cell-based work had suggested that ACE2 was the receptor for the severe acute respiratory syndrome coronavirus (SARS-CoV) and now, reporting in *Nature Medicine*, Keiji Kuba and colleagues provide the first *in vivo* evidence that ACE2 has a crucial role in SARS infections using *Ace2* knockout mice. The researchers go on to propose that the SARS-CoV spike protein exacerbates acute lung failure by deregulating the renin–angiotensin pathway.